



Using Solar PV-Potentiated SRM Effort With Supply Power Control Functions

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Abstract: Electric vehicles(EVs) provide a workable solution to reduce greenhouse gas emissions and thus become a hot topic for research and development. SRM is one of the engines that enforce EV applications. To extend EV driving miles, the use of vehicle photovoltaic (PV) panels reduces vehicle battery reliability. Due to the characteristics of the SRM phase transformer, it is suggested in this article to convert three ports to control the energy flow between the PV panel and the battery and SRM devices. Six operating modes were introduced, four of which were developed for driving and two for loading at the station. In driving modes, the maximum power point monitoring (MPPT) for the PV panel and SRM speed control is performed. In station charging modes, the loaded charging network topology is developed without the need for external devices. When the PV panel recharges the battery directly, a multi-section charging strategy is used to power it. MATLAB / Simulink-based simulation results and experiments demonstrate the effectiveness of the proposed three-port switcher. This can have economic impacts on improving market acceptability.

Keywords: Electric Vehicles; Photovoltaic; Maximum Power Point Tracking; Switched Reluctance Motors (Srms);Tri-Port Converter;

1. INTRODUCTION:

For motor engines, high performance permanent magnet (PM) machines are widely used, and rare materials are needed in large quantities, which limit the wide application of EVs. To address these issues, the light (PV) and non-stop impedance (SRM) engine are provided, respectively, with power supply and motor. First of all, adding a PV panel to the EV panel results in a sustainable power source. Currently, a conventional passenger car has enough surface area to install a 250 watt PV panel. Second, SRM does not require rare Earth PMs, and is strong enough to focus more on EV applications. While PV panels have a low energy density for traction motors, they can be used mostly to charge batteries [1]. Overall, the EV photoelectric EV has a similar structure to a hybrid electric vehicle (HEV), instead of an internal combustion engine (ICE) PV plate. Figure 1 shows the PV-powered power system. Its main components include an external charging station, PV, batteries and power adapters. To reduce power transfers, one method is to redesign the engine to incorporate some features in the charging bin. For example, the paper designs a 20 kW PM phase motor for EV charging, but has a lot of harmonic content with an electric background power motor (EMF). Another solution is based on traditional SRM. Get the paper load and power factor corrected at 2.3 kW SRM. Using machine conversions as input filter inductor. The concept of standard structure for document topology is

proposed in this paper. Based on a power unit (IPM), a four-stage bridge transducer is used to drive and charge networks. Although modules support mass production, using a half bridge or topology reduces system reliability (such as shooting problems). The paper develops a simple topology, plug-ins that supports flexible energy flow [2][3]. To charge the network, however, the generator must be connected to the generator, which speeds up the energy transfer process and reduces the efficiency of charging. However, an effective topology and control strategy for PV photo electricity has not been developed. Since PV has different properties of ICE, maximum power monitoring (MPPT) and solar power utilization are unique factors for PV feeder EVs. For flexible and energy efficient modes of energy flow, a low-cost three-port transformer is proposed in this article for harmonizing PV, SRM and battery board. Six operating modes have been developed to support flexible power flow control. The proposed triple port topology consists of three power stations, PV, battery and SRM. It is connected by a power transformer consisting of four switches (S0 - S3), four diodes (D0 - D3) and two relays, as shown in Figure 2. By controlling relays J1 and J2, six operating modes are supported, as shown in Figure 3; the corresponding shipping procedures are listed in Table 1. As in # 1, PV SRM is a power source for driving and recharging batteries. In mode 2, the photoelectric and battery are the power source for

the SRM engine.

II. PHOTOVOLTAIC SYSTEM

A photovoltaic cell or solar panel is a device that converts voltage into separate solar energy. Sometimes, the term photovoltaic is used for clearly planned designs from dawn to dusk, but the term solar cell is used when power is not mentioned. Cell arrays are known for their networks of photovoltaic cells, a star or photovoltaic cells. Photovoltaic is similar to the demand for solar radiation by solar collectors [4].

The efficiency of solar cells is 6% in the case of silicon-based solar panels, up to 40.7% in the study of legions with laboratory cells, and 42.8% in a half-dead container. Solar energy conversion is about 14-19% of commercially available solar panels for commercial efficiency. Solar cells can also bother more computer strategies to block intrinsic energy in the sun. Solar panels are called the charger, star bikes, and cosmic lanterns that can be used daily.

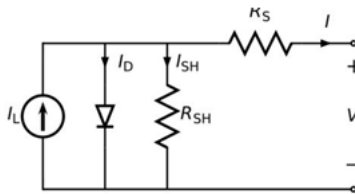


Fig: 1The equivalent circuit of a solar cell

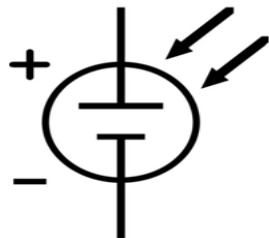


Fig: 2 the schematic symbol of a solar cell

III. DC-DC CONVERTERS

Figure 3 is a high-voltage DC-DC converter with an inductor and filter to reduce common electromagnetic interference. Here a back-and-forth transformer was developed with coupled inductor and output voltage accumulator. A large-scale transformer was introduced using coupled inductor and dual-voltage technology to accumulate output voltage for increased voltages. A high-step pulse transformer is proposed that uses multiple coupled filters to accumulate output voltage.

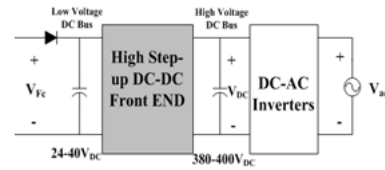


Fig: 3 General Power generation systems with a high step-up converter

IV. BUCK CONVERTER

Backpack is the most common DC adapter topology. These applications require fast, transient line response and high efficiency during a large load time. The low voltage source can switch the voltage regulator. For example, inside a computer system, you must reduce the voltage and reduce the voltage [5]. For this purpose the buck adapter can be used. Additionally, the Pak adapters provide longer battery life for portable systems that spend "standby" most of their time. Supply control regulators are usually used as a switching power supply for the digital baseband and RF amplifier.

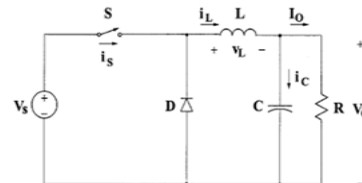


Fig. 4 According to Faraday's law

V. CONTINUOUS MODE

When the transformer thinker operates continuously, the current through the IL inductor never drops to zero. Figure 6.3 shows typical wave and voltage waveforms in a transformer operating in this mode. The output voltage can be calculated as follows, in the case of an ideal transformer that is, using components with optimal behavior that operate under stable conditions.

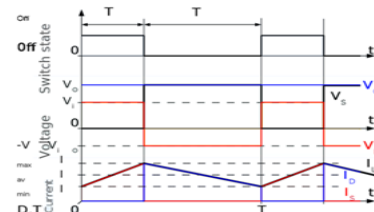


Figure 5: Waveforms of current and voltage in a boost converter operating in continuous mode

VI. PROPOSED SYSTEM

The three-port chassis consists of three power stations, PV, battery, and SRM. The four switches ($S_0 - S_3$), four diodes ($D_0 - D_3$) and two relays are connected by a power transformer, as shown in Figure 2 [26]. By controlling relays J1 and J2, six operating modes are supported, and the related posting procedures are given in Table 1. In PV 1 mode, SRM is the power source for driving and recharging the battery [6]. In mode 2, both PV and battery are power sources for the SRM. In mode 3 the PV source is on and the battery is inactive. In the fourth mode, the battery is the power source and the light is not active. In mode 5, the battery network is charged by one network while PV and SRM are stationary. As in 6, the PV and SRM battery charging is idle.

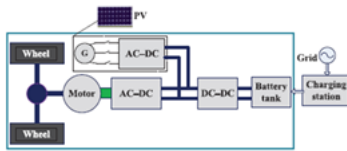


Fig.6. PV-fed HEV.

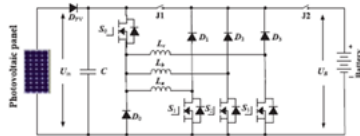


Fig. 7. Proposed tri-port topology for PV-powered SRM drive.

SIMULATION RESULTS

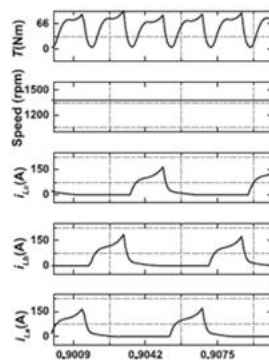


Fig. 8 Simulation results of single-source driving mode

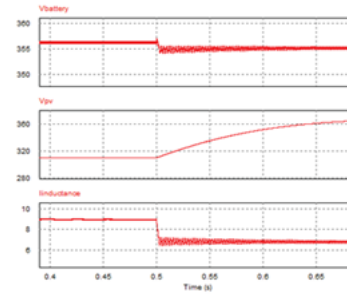


Fig.9 Simulation results for charging modes Grid charging.

VII. CONCLUSION

To address the concern of using EVs and reducing system cost, a combination of PV and SRM plate is proposed as an EV disk system. The following are the main contributions of this article. 1) A three port transformer is used to form PV, battery and SRM panels.

2) Six working modes have been developed for flexible control, hybrid drive / recharge control and charging control for flexible energy flow.

3) The new network charging topology is built without the need for an external electronic power device.

4) A battery charge control system has been developed to improve the use of solar energy. As PV-powered EVs are greener and more sustainable than conventional ICEs, this work will provide a practical solution to reduce the overall cost and emissions of carbon dioxide from electrified compounds. In addition, the proposed technology can also be applied in similar applications to consumers of electric power. Fuel cells have a high energy density and are therefore more suitable for EV applications.

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